ORIGINAL ARTICLES

Changes in Patient Profiles at a Regional Respiratory Medicine Clinic Over a 10-Year Period

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OBJECTIVE: To analyze the quantitative and qualitative changes in demand for health care services at a regional respiratory medicine clinic over a 10-year period.

PATIENTS AND METHODS: During the years 1992-1993 (group A) and 2002-2003 (Group B), the following information was recorded for all new patients: referring physician's initial diagnosis, pneumologist's definitive diagnosis, age, sex, and source of referral (primary care clinic, emergency department, hospital admission, other specialist services, and other sources). The recorded data were then compared between groups.

RESULTS: Group A comprised 616 patients and group B 424. Most subjects were men (60%) aged 40 to 80 years (71.9% of group A; 75.7% of group B). In both groups, most referrals came from primary care. The number of patients in group B who were referred by primary care and by emergency departments decreased in comparison with group A, while referrals from all other sources increased (*P*<.001). Initial diagnosis of airway diseases and associated symptoms produced most of the demand for health care services (group A, 58%; group B, 62.2%). When the 2 groups were compared, the following changes were observed in group B: *a)* an increase in hospital-referred cases with right heart disease (*P*<.001; relative risk [RR], 7.3) and in cases of obstructive sleep apnea syndrome (OSAS) (*P*<.001; RR, 24.3)–the most common diagnosis in group B-referred from primary care and other specialist services and *b)* an overall decrease in cases of tuberculosis (*P*<.001; RR, 0.3) and in referrals made without a recorded initial diagnosis by primary care physicians. When definitive diagnoses were analyzed, the initial diagnosis was confirmed in a high percentage of patients with airway diseases (group A, 47.2%; group B, 53.1%). An increase in cases with a definitive diagnosis of OSAS was observed in group B (*P*<.001; RR, 18.3) compared to group A. In addition, a 2-fold increase was recorded for right heart disease and consultations for radiographic abnormalities. The number of patients diagnosed with tuberculosis decreased.

CONCLUSIONS: The changes observed over the 10-year period analyzed were as follows: *a)* a decrease in referrals made by primary care centers and emergency departments and an increase in referrals from other sources; *b)* a significant increase in referrals for OSAS, which became the most common reason for consultation; *c)* an increase in referrals for right heart disease; and *d)* a decrease in tuberculosis cases.

Key words: *Patient profile. Respiratory medicine health services needs and demand. Respiratory medicine clinic.*

Cambios en el perfil de una consulta neumológica comarcal. Perspectiva de 10 años

OBJETIVO: Analizar los cambios cuantitativos y cualitativos de la demanda asistencial generada en una consulta neumológica comarcal en los últimos 10 años.

PACIENTES Y MÉTODOS: Durante los períodos correspondientes a los años 1992-1993 (grupo A) y 2002-2003 (grupo B), de todos los pacientes remitidos como primera visita se registraron los siguientes datos: diagnóstico del médico que remitía al paciente (DI), diagnóstico final del neumólogo, edad, sexo y procedencia (atención primaria, urgencias, hospitalización, otra especialidad y otra procedencia). Se describen las variables y se comparan éstas entre los grupos A y B.

RESULTADOS: El grupo A constó de 616 pacientes y el grupo B de 424, con predominio de varones (60%) y mayor demanda entre 40 y 80 años (grupo A: 71,9%; grupo B: 75,7%). Atención primaria remitía la mayor parte de los pacientes, pero con una disminución de ésta y de urgencias en el grupo B, frente a un aumento del resto de procedencias (p < 0,001). En cuanto al perfil de los DI, las enfermedades de la vía aérea y los síntomas generaban la mayor demanda (grupo A: 58%; grupo B: 62,2%), pero al comparar ambos grupos, en el B se observaron: *a)* un aumento de síndrome de apneas obstructivas durante el sueño (SAOS) (p < 0,001; riesgo relativo [RR] = 24,3), que procedía de atención primaria y otras especialidades y constituía el diagnóstico más frecuente, así como de enfermedad cardiovascular de origen derecho (p < 0,001; RR = 7,3), procedente de hospitalización, y *b)* una disminución de enfermedad tuberculosa (p < 0,001; RR = 0,3), de diversas procedencias, así como de los pacientes remitidos desde atención primaria sin que constara el motivo de consulta. Por lo que se refiere al perfil de los diagnósticos finales, se confirmó el perfil del DI con una elevada frecuencia en las enfermedades de la vía aérea (grupo A: 47,2%; grupo B: 53,1%), aumento de SAOS en el grupo B (p < 0,001; RR = 18,3); además, se duplicaron los casos de enfermedades cardiovasculares derechas y de consulta por alteraciones radiológicas, y disminuyó la enfermedad tuberculosa.

CONCLUSIONES: Los cambios observados en el período de 10 años analizado son los siguientes: *a)* pérdida de pacientes procedentes de atención primaria y urgencias, junto a aumento del resto de procedencias; *b)* importante aumento del SAOS, que pasa a ser la causa más frecuente de consulta; *c)* aumento de enfermedades cardiovasculares derechas, y *d)* disminución de la enfermedad tuberculosa.

Palabras clave: *Perfil neumológico. Demanda asistencial neumológica. Consulta de neumología.*

Introduction

Rapid technological and scientific development, combined with complex economic and social factors, drive progress in medicine and increase the general level of health care. At the same time, however, these developments lead to changes in the risks to which we are exposed and in the profile of prevailing diseases; such changes can even affect how medical specialties are organized. Lung disease is a particularly representative example of these changes. The discovery of *Myobacterium tuberculosis* by Koch[1] and the subsequent availability of appropriate tuberculosis treatments[2,3] represented a qualitative shift in the treatment of respiratory diseases. Indeed, this discovery marked the end of the study of tuberculosis per se and the beginning of respiratory medicine.[4,5]

More recently, various journals have stressed that tobacco use is the driving force behind the rapid growth in chronic respiratory diseases such as lung cancer and chronic obstructive pulmonary disease (COPD), both of which will be among the top 4 causes of death in Europe in the year 2010.[6,7] However, these predictions are based on epidemiological studies of morbidity and mortality and data from such studies do not always correspond to those observed in our everyday practice. Information in the literature on this topic is scant[8-10] and does not always reflect the changes and trends that pneumologists experience on a daily basis. As respiratory care specialists, we realize that the profiles of the respiratory diseases that we treat daily are changing and these changes are, in turn, affecting patient demand for respiratory care.

On the other hand, managing health care processes to properly administer patient care and optimize limited resources requires expert knowledge of the most prevalent diseases as well as an understanding of the priorities of respiratory care. From this perspective, detecting the changes that have occurred in the disease profile of respiratory illnesses in recent years is a priority. Indeed, that is the reason why this study was developed. The objective of our study was to evaluate the quantitative and qualitative changes in patient demand for health care services at a regional respiratory clinic over the 10-year study period.

Patients and Methods

All new patients referred to our respiratory medicine clinic during the years 1992-1993 (group A) and 2002-2003 (Group B) were included in the study. The following information was recorded: age, sex, source of referral, initial diagnosis, and definitive diagnosis. The source of referral was classified by level of care: primary care, emergency department, hospital admission, other specialist services, and other sources. The initial diagnosis–the reason for the consultation–was the one made by the referring physician. The definitive diagnosis was made by a pneumologist at the pulmonology clinic after examination of the patient and any additional tests deemed necessary. The information was collected in a database designed specially for the clinic. All data related to patient management, including diagnosis, were recorded.
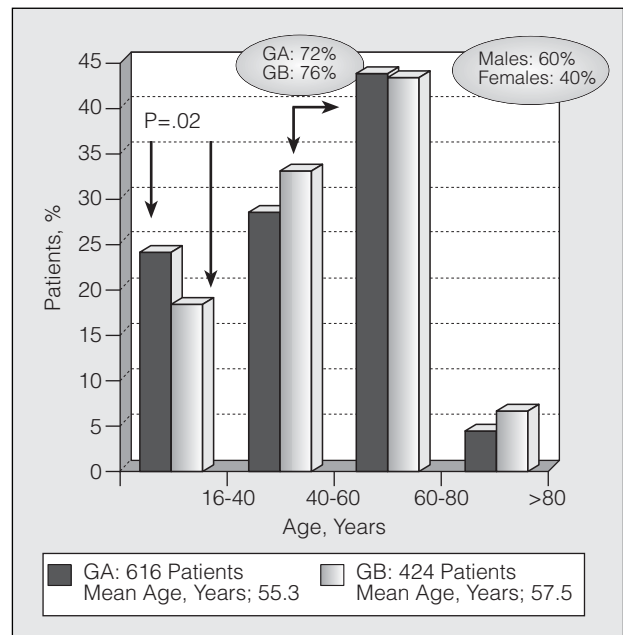

Figure 1. Distribution of patients in group A (GA), 1992-1993, and B (GB), 2002-2003, by age and sex.

Statistical Analysis

A descriptive study of the recorded variables was performed. The χ^2 test was used to compare qualitative variables between groups. Relative risk (RR) and 95% confidence intervals (CI) were also calculated.

Results

Group A comprised 616 patients and group B 424. Figure 1 shows the distribution, in percentages, of patients by sex and age range for both groups. Fewer patients in group B than in group A were referred for treatment and group B patients were older (mean [SD] age, 55.3 [19.2] in group A and 57.5 [18.1] in group B). Patients aged 40 to 80 years accounted for most of the demand for health care services (group A, 71.9%; group B, 75.7%). Most patients in both groups were male (60%), with no significant differences in distribution by age or sex observed between the groups. However, the number of patients aged 16 to 40 years decreased significantly in the period between the formation of group A to period B (*P*=.02; RR, 0.75; 95% CI, 0.59-0.96).

In both groups, most referrals were made by primary care physicians (Figure 2), although fewer patients in group B came from that source or from the emergency department compared to group A. However, significantly more referrals came from other sources in the group B period (*P*<.001).

The initial and final diagnoses and the comparison between groups are shown in Table 1. Diseases of the airway and associated symptoms were the most common causes of referral and together accounted for 58.4% of the demand for health care services in group A and 62.2% in group B. Dyspnea, cough, and
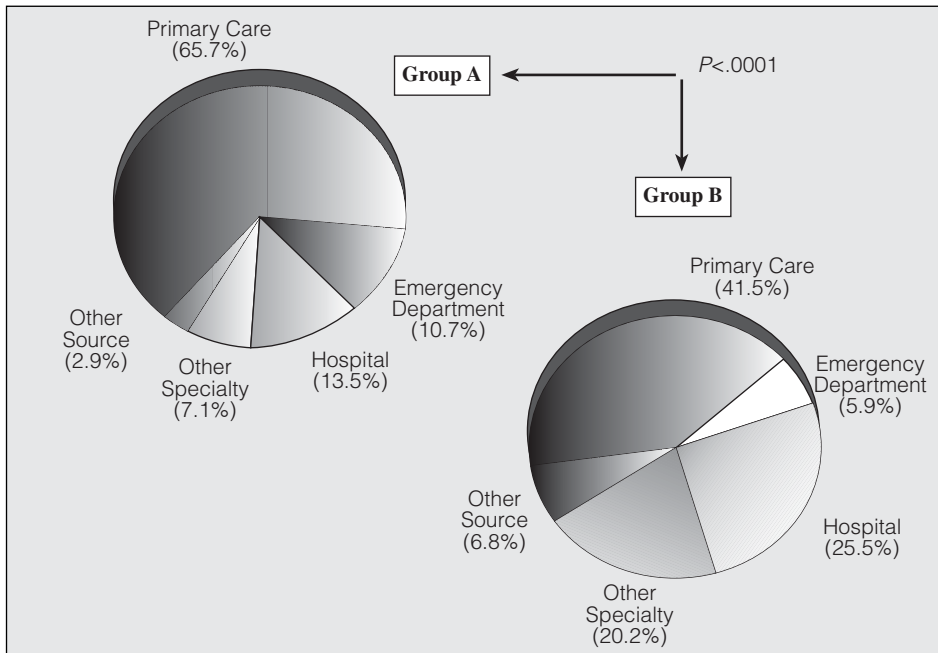
Figure 2. Distribution, in percentages, of patients from both groups by source of referral. All between-group differences were significant (*P*<.0001).

hemoptysis were the most common symptoms and no significant differences were observed between groups. Consultations for chest pain, however, did decrease significantly from the period of formation of group A to that of group B (*P*=.007; RR, 0.26; 95% CI, 0.09-0.76).

Compared to group A, group B included significantly more referrals for upper airway diseases (*P*<.001; RR,

7), heart disease (*P*<.001; RR, 4.6), and radiographic findings (*P*≤.05; RR, 1.9). The increase in upper airway complaints was attributable to a rise in obstructive sleep apnea syndrome (OSAS), which resulted in a very significant increase (by a factor of 24.3) in referrals in the group B period in comparison with 10 years earlier (*P*<.001; RR, 24.3, 95% CI, 8.9-66.2). Most of the

TABLE 1
Initial and Definitive Patient Diagnoses, in Percentages, for 1992-1993 (Group A) and 2002-2003 (Group B)*

	Initial Diagnosis			Definitive Diagnosis		
	Group A	**Group B**	**P**	**Group A**	**Group B**	**P**
UAD	2.4	1.2	≤.01	6.9	18.7	≤.01
OSAS	0.6	15.8	≤.01	0.5	9.8	≤.01
Other UAD	1.8	1.4		6.4	8.9	
LAD	32.9	28.1		40.3	34.4	
Bronchitis-COPD	14.9	11.6		17.4	15.5	
Asthma	13.5	13.9		18.7	15.7	
Other UAD	4.5	2.6		4.2	3.2	
Symptoms	23.1	16.9	≤.05	3.2	2	
Dyspnea	7.8	5.9		0.6	0.5	
Cough	6.5	6.1		0.2	0.3	
Hemoptysis	4.9	3.5		1.1	0.5	
Chest pain	3.6	0.9	≤.01	1.2	0.3	
Other symptoms	0.3	0.5		0.1	0.3	
Tuberculosis	7.8	2.3	≤.01	15.9	4.4	≤.01
Infectious disease	6.3	7		3.7	5.2	
Pleural disease	1.3	2.8		4.4	6.2	
Tumor	1.9	2.8		5.1	4.6	
Interstitial disease	0.6	0.9		0.7	1.7	
Radiographic change	7.3	11	≤.05	1.1	3.1	≤.01
No initial diagnosis recorded	12.3	2.5	≤.01			
Normal pneumological examination				9.8	7	
Chest wall disease	0.6	1.2		2.7	3.6	
Heart disease	1	4	≤.01	5.3	5.3	
Right-sided	0.6	3.5	≤.01	1.5	3.2	≤.05
Left-sided	0.4	0.5		3.8	2.1	
Other diagnosis	2.3	3.1		1.3	1.5	

*UAD indicates upper airway disease; OSAS, obstructive sleep apnea syndrome; LAD, lower airway disease; COPD, chronic obstructive pulmonary disease.

TABLE 2
Significant Changes in Initial Diagnoses From 1992-1993 (Group A) to 2002-2003 (Group B) by Referral Source[*]

| | Initial Diagnosis | | | | | | | | | | | | | | |
| | Primary Care | | | Hospital | | | Emergency Department | | | Other Specialties | | | Other Source | | |
	GA	GB	P	GA	GB	P	GA	GB	P	GA	GB	P	GA	GB	P
OSAS	0.2	8.7	≤.01	0.2	0.3					0.2	6.6	≤.01		0.2	
Chest pain	2.8	0.7	≤.01				0.6			0.2	0.2				
Tuberculosis	4.2	0.7	≤.05	1.9	1.1	≤.05	0.8			0.8	0.2	≤.01		0.2	
Radiographic change	2.9	5.4	≤.01	0.8	0.7		1.9	1.2		1.5	2.8		0.2	0.5	
No initial diagnosis recorded	10.6	1.7	≤.01							0.2	0.2		1.5	0.7	≤.01
Right heart disease				0.3	3.5	≤.01				0.2					

[*]Data are expressed as percentages. GA indicates group A; GB, group B.

increase in referrals for cardiovascular disease was due to right heart disease ($P<.001$; RR, 7.26, 95% CI, 2.12-24.94). When we compared the reason for consultation to the referral source (Table 2), we found significant increases in referrals for OSAS (due to more referrals from primary care [$P<.001$; RR, 85.14; 95% CI, 11.77-615.68] and other specialties [$P<.001$; RR, 14.33; 95% CI, 2.02-101.84), abnormal radiographic findings (from primary care), and right heart disease (upon hospital discharge ($P<.005$; RR, 5.76; 95% CI 1.36-24.51)].

In contrast, referrals for tuberculosis declined between the 2 time periods ($P<.001$; group B RR, 0.30; 95% CI, 0.15-0.59), as did referrals for patients without a recorded initial diagnosis ($P<.001$; RR, 0.17; 95% CI, 0.09-0.33). Analysis of the referral sources for these cases (Table 2) showed that the decrease in tuberculosis patients in group B was due to a fall in referrals from primary care ($P=.016$; RR, 0.27; 95% CI, 0.08-0.87), hospital discharge ($P=.018$; RR, 0.32; 95% CI, 0.12-0.87), and other sources ($P=.008$; RR, 0.10; 95% CI, 0.01-0.85). Fewer referrals from primary care ($P=.001$; RR, 0.24; 95% CI, 0.11-0.52) and other sources ($P=.002$; RR, 0.21; 95% CI, 0.06-0.66) accounted for the decrease in patients without a recorded initial diagnosis.

As Table 1 shows, the most common definitive diagnosis in patients from both time periods was airway disease (group A, 47.2%; group B, 53.1%). Airway diseases also accounted for most cases of dyspnea (group A, 52.1%; group B, 40%). Particularly implicated were COPD, chronic bronchitis, and asthma. Airway and infectious diseases were the most common causes of cough (group A, 87.5%; group B, 80.6%) and hemoptysis (group A, 53%; group B, 66%). Changes in the definitive diagnosis between the formation of group A and group B were similar to those described for the initial diagnosis. Specifically, definitive diagnoses of OSAS increased significantly (by a factor of 18.3) from time period A to B ($P<.001$; RR, 18.3; 95% CI, 7.39-45.46). Group B diagnoses of right heart disease ($P<.05$; RR, 2.2; 95% CI, 1.10-4.32) and radiographic abnormalities doubled, while tuberculosis diagnoses decreased ($P<.001$; RR, 0.29; 95% CI, 0.20-0.44).

Discussion

This study showed that quantitative and qualitative changes occurred in the demand for health care services at a regional respiratory medicine clinic over a 10-year period. The overall profile of patients referred to our clinic continues to be similar to that described in a previous study.[8] Age distribution was comparable–although patients in the 2002-2003 time period tended to be slightly older than in the 1996 study–and males continued to predominate (male/female, 1.5). Similarly, the need for health care generated by airway diseases and for the evaluation of respiratory symptoms remained high. Notwithstanding these similarities, it is important to note that patient profiles have also changed significantly over time. Consultations for OSAS, radiographic changes, and right heart disease all increased whereas referrals for tuberculosis and cases without a recorded initial diagnosis fell. A particularly noteworthy finding from our study was the increase in referrals for OSAS, which rose by a factor of 24 over the 10-year period. OSAS is now the most common initial diagnosis.

Other authors used a method similar to the one employed in our study to analyze data from a tertiary care hospital to reveal the impact of OSAS on respiratory care outpatient clinics.[10] In that study, 55% of patient consultations were for OSAS, which was the most common definitive diagnosis (30%). A large, multicenter study that collected data on various aspects related to the diagnosis of OSAS found a 12-fold increase in diagnoses of OSAS over the 9-year period studied (1990-1998).[11] Given these results, the authors stressed the importance of reaching a consensus on protocols for the early detection and appropriate management of this syndrome to achieve optimal results. The creation of sleep laboratories, as the Spanish national consensus on OSAS[12] recommended, might be one way to fully utilize the resources available

for diagnosing and monitoring OSAS. Establishing such laboratories would reduce the demand OSAS places on general practice respiratory care clinics.

Several factors–including the rapid technological advances in diagnostic imaging techniques that have occurred over the 10-years between formation of the 2 groups and the greater availability of these diagnostic tools at all levels of care–are probably responsible for the increase in referrals for the evaluation of radiographic alterations and right heart disease. Those observations, and also the decrease in referrals for tuberculosis or of patients referred without a diagnosis, are very probably a result of the increase in the number of generalists in recent years and improved training of these physicians through residency programs. The fortunate assignment of these professionals to primary care centers may partially explain recent improvements in health care quality.[13,14]

Fewer new patients were referred to our clinic for an initial evaluation in the 2002-2003 period than in 1992-1993. This decline was due to fewer referrals from primary care and the emergency department; the increase in patient referrals from other sources was insufficient to offset this. We should point out that, in our hospital–as in other regional hospitals–respiratory medicine is part of the internal medicine service and, over the last few years, internists have been screening patients before making a referral in an attempt to reduce caseloads in specialized care. This may partially explain the decrease in referrals from primary care and the emergency department. Of course, other factors related to the internal functioning of those 2 departments–such as an increase in the quantity and type of services provided in primary care, including the addition of monitoring programs for patients with chronic respiratory diseases–may also have played a role.[15,16]

Unfortunately, we were unable to analyze the profile of patients who had not been referred to our clinic, nor were we able to evaluate other indicators of health care quality in the respiratory care clinic. However, given the scant diffusion of spirometry and other specialist techniques outside of pulmonology departments,[17-19] it seems likely that a study of the most common diseases (COPD, asthma, OSAS) in this group of unreferred patients would not have been completely satisfactory. Nonetheless, we can still reflect on the reduced impact–in terms of referrals from primary care and the emergency department–that regional respiratory medicine clinics have experienced over the 10-year study period. This is perhaps one of the most notable findings from our study and should motivate us to improve relations between primary and specialized care.

However, it is important to emphasize that very little information is available in the literature on the optimal model for relations between these 2 levels of care. Moreover, no adequately validated model–based on efficiency, resource optimization, or quality of health care delivered–is currently available. Generalists and patients have both been said to be satisfied with a new mixed-care respiratory health care model an alternative to the traditional scheme in which the pneumologist was either the primary provider of respiratory care or simply a consultant for specific, complex respiratory problems.[20] The mixed care model was based on coordinated action between primary and specialized care, with a limited–though well-defined–participation by the pneumologist after treatment criteria for the most common diseases had been established.[21] Unfortunately, no results on the cost-effectiveness or quality of health care that would support the validity of this model have been reported. Nevertheless, there can be little doubt that agreement on protocols, the increasing use of techniques from respiratory medicine in primary care, and the periodic consultation of pneumologists for respiratory complaints may be considered progress towards improved relations between pneumology and primary care.

This study has demonstrated a decrease in demand for services at a regional outpatient respiratory medicine clinic over a 10-year period. The fact that fewer patients were referred by primary care physicians and the emergency department reveals much about the reduced impact of pneumology in respiratory care at that level. This situation should stimulate reflection on how to properly care for these patients and on how that care should be coordinated between pneumologists on the one hand and primary care physicians and emergency departments on the other. Our study also revealed qualitative changes in the profile of diagnoses made over the 10-year study period, including a decrease in diagnoses of tuberculosis and an increase in right heart disease and, especially, OSAS. Referrals for OSAS increased to such an extent that this syndrome is now the most common reason for consultation.

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